

**STATE OF VERMONT
PUBLIC SERVICE BOARD**

Docket No. 7032

Joint Petition of Vermont Electric Power Company, Inc. (“VELCO”), Green Mountain Power Corporation (“GMP”) and the Town of Stowe Electric Department (“Stowe”) for a Certificate of Public Good pursuant to 30 V.S.A. § 248 authorizing VELCO to upgrade a substation in Moretown, Vermont; construct .3 miles of side by side, single pole tap; construct a switching station in Duxbury, Vermont; construct 9.4 miles of 115 kV transmission line; upgrade an existing GMP 34.5 kV subtransmission line; construct a substation in Stowe, Vermont; and for Stowe to construct 1.05 miles of 34.5 kV subtransmission line in Stowe, Vermont.

**PREFILED REBUTTAL TESTIMONY OF
RYAN C. JOHNSON**

**ON BEHALF OF
VERMONT ELECTRIC POWER COMPANY, INC.**

Mr. Johnson’s rebuttal testimony responds to proposals to alter the configuration of pole structures and to right-of-way clearing issues.

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**PREFILED REBUTTAL TESTIMONY OF
RYAN C. JOHNSON**

**ON BEHALF OF
VERMONT ELECTRIC POWER COMPANY, INC.**

1 Q1. Are you the same Ryan Johnson who prefiled testimony with the Petition in this Docket?

2 A1. Yes. My name, address, employment background and qualifications are set forth in that
3 testimony.
4

5 Q2. What is the purpose of your rebuttal testimony?

6 A2. In response to DPS witness testimony, I will discuss reducing the height of the 115 kV
7 structures by compressing the spacing; the reliability of single pole, single circuit
8 structures in parallel versus single pole, double circuit structures; tree clearing; and
9 lightning shield angles.
10

11 Q3. Please describe your concerns with Mr. Smith’s proposal to compress the clearances to
12 minimize the height of the 115 kV poles.

1 A3. VELCO has proposed single pole davit arm construction for the 115 kV line. The davit
2 arms provide the spacing required for safe working clearances during maintenance of the
3 line while it is energized. Reducing the spacing would jeopardize the safety of line
4 workers trying to perform this maintenance. Line crews working on a structure
5 supporting energized lines with spacing reduced from that proposed by VELCO would
6 result in violation of National Electrical Safety Code requirements. It is important in this
7 case that VELCO be able to perform maintenance without taking the 115 kV line out of
8 service, due to the reliability concerns of the LCSA. This is especially critical in the
9 single pole double circuit configuration because if maintenance cannot be done “hot”,
10 both circuits must be de-energized.

11
12 Q4. What are the reliability advantages of having the 115 kV and 34.5 kV lines on separate
13 structures?

14 A4. There are a few reliability advantages:

- 15
16 - If both lines are on the same structure and there was a catastrophic failure of the
17 structure, both circuits would be lost. The restoration of the structure(s) would
18 take longer than if the lines were on separate structures.
- 19
20 - Having both lines on the same structures will increase the possibility of losing
21 both lines due to a danger tree falling. With the circuits on separate structures
22 there is a greater possibility that a danger tree would fall on one line but not
23 contact the other.
- 24
25 - If both lines were on the same structure and that structure needed to be replaced
26 for maintenance, keeping both lines in service during the replacement would be
27 very time consuming and costly, if not impossible.
- 28

1 Q5. If both the 115 kV and 34.5 kV lines were to be installed on the same structure do you
2 feel it would be important to design the structures supporting both lines to a higher
3 “robustness” in order to reduce the possibility of structure failure during extreme weather
4 conditions?

5 A5. Yes. If both lines were to be installed on the same structure I would recommend utilizing
6 a steel pole supported by a concrete foundation. This type of construction is utilized on
7 the VELCO system in South Burlington for a double circuit 115 kV/34.5 kV
8 configuration.

9
10 Q6. What is the preliminary cost difference between the single pole, single circuit structures
11 in parallel versus single pole, double circuit structures?

12 A6. The cost estimate of the difference between two circuits as proposed by VELCO and the
13 115 kV and 34.5 kV on a single steel pole with concrete foundation is approximately
14 \$900,000 per mile.
15

16 Q7. What are VELCO’s right-of-way clearing concerns with reducing pole heights?

17 A7. Both Mr. Smith and Mr. Raphael propose reducing pole heights. However, Mr. Smith
18 recognizes that to the extent pole heights are reduced, VELCO must be even more careful
19 in right-of-way clearing and in identifying and cutting danger trees.
20

21 Mr. Raphael, on the other hand, does not seem to recognize that lower pole heights
22 reduce VELCO’s flexibility in right-of-way clearing. For example, in DPS-DR-1, page
23 26, Mr. Raphael suggests lower poles for mile 6.9 – 7.1 in Stowe. The pictures on pages
24 87 and 89 illustrating this area make it clear that Mr. Raphael wants all existing
25 vegetation retained. We want to make it clear that the lower the height of the pole, the
26 more concerned we must be with vegetative management. This is really only common
27 sense, as the lower the line, the more potential exists for trees to reach the height of the

1 line. To the extent that poles and lines are constructed at the minimum height, a tradeoff
2 may be required in terms of right-of-way clearing and cutting of danger trees.
3

4 Q8. What danger tree clearing will be required along this corridor to provide reliable
5 transmission service to the Lamoille County area?

6 A8. Regardless of whether we build single pole double circuits or stay with VELCO's current
7 proposal, at a minimum, VELCO intends to clear all trees that pose a danger to falling on
8 the 115 kV line. Our intent is to significantly reduce or eliminate failure of both lines
9 due to a danger tree falling.
10

11 Q9. Has Mr. Smith calculated the impact on shield angle of his proposal to minimize pole
12 heights?

13 A9. Yes. At pages 18-19, lines 20 through 6, Mr. Smith calculates that VELCO's proposed
14 design has a shield angle of 60° and that his proposed compressed design has a shield
15 angle of 45°.
16

17 Q10. Do you agree with Mr. Smith's calculations?

18 A10. No, not entirely. We have designed our single pole, single circuit 115 kV structure to
19 have a shield angle of 36°. The typical transmission structure shield angle is 30 - 45°
20 with the lower number the better lightning protection. Again, the proposed height
21 mitigation reduces the reliability of the Project.
22

23 Q11. Does this conclude your rebuttal testimony?

24 A11. Yes.